

A case report of immediate autotransplanted teeth: 2-year follow-up

A follow-up study of autotransplantation

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Abstract

Autotransplantation is the removal of tissue or an organ from an area of a living being's body and its transplantation to another area in the same body. Autotransplantation plays a key role in replacing missing teeth of young patients since this procedure has many advantages compared to fixed prosthesis and implant applications in individuals of developmental age. General indications for autotransplantation are periodontal causes and tooth loss that cannot be restored due to caries or trauma. On the other hand, external root resorption and dentoalveolar ankylosis are the most common complications of autotransplantation. Autotransplantation is a treatment method that can result in a high success rate when attention is paid to the necessary prognostic factors.

Keywords

Atraumatic Extraction, Autotransplantation, CBCT

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Introduction

Autogenous tooth transplantation, or autotransplantation is defined as the transfer of an impacted or erupted tooth from the region of the same individual to the surgically prepared socket or extraction space at the recipient site [1]. In the repositioning of donor teeth, the position of the teeth that are congenitally missing or have been lost due to reasons such as dental caries, trauma, and periodontal diseases is one of the most important criteria [2]. In the literature, the long-term success rate of autotransplantation has reached 93% [3]. It has been reported that many factors, such as the patient’s age, the type and root development level of the tooth to be transplanted, the compatibility between the tooth and the recipient site, atraumatic operation, postoperative stability and vertical height of the transplanted tooth, are effective in the success of autotransplantation before and after operation [4].

In this case report, we present the molar and premolar autotransplantations and follow-ups in two patients and the success rates of autotransplantation, factors affecting prognosis, and complication risks.

Case Report

Case 1:

In this case, the transplantation of the left third molar of a patient with a follow-up period of 2 years to the space of the first molar, which cannot be restored due to a vertical fracture in the same region, is explained.

A 24-year-old healthy female patient presented to the surgical clinic of Sivas Cumhuriyet University Faculty of Dentistry due to pain in her mandibular left first molar. In the intraoral and radiological examination, a vertical fracture was determined in tooth number 36, and tooth extraction was indicated (Figure 1A, 1B). It was decided that tooth number 38 without caries in the same region was suitable for transplantation, and the patient was informed about the transplantation treatment. After obtaining informed consent from the patient, tooth number 36 was extracted atraumatically without damaging the buccal bone under local anesthesia (Ultracain D-S Forte, Aventis, Turkey). Then, the third molar was extracted without contacting the root surface to prevent damage to the periodontal ligaments, and carefully placed in the socket of the first molar. The tooth was then positioned appropriately in the dental arch and sutured primarily. Thus, the tooth was also splinted. Afterward, the tooth was reduced from the occlusion by about 1 mm to avoid occlusal trauma (Figure 1C).

The patient was prescribed antibiotics (amoxicillin + clavulanic acid 1000 mg twice a day), analgesics (paracetamol 500 mg twice a day), and antibacterial mouthwash (benzydamine HCl + chlorhexidine gluconate). Sutures were removed 10 days after the operation, and endodontic treatment was applied.

In the postoperative 4th month, no mobility in the tooth and no signs of infection were observed in the clinical examination. In the radiographic examination, the onset of bone apposition was seen around the roots of the transplanted tooth, and there were

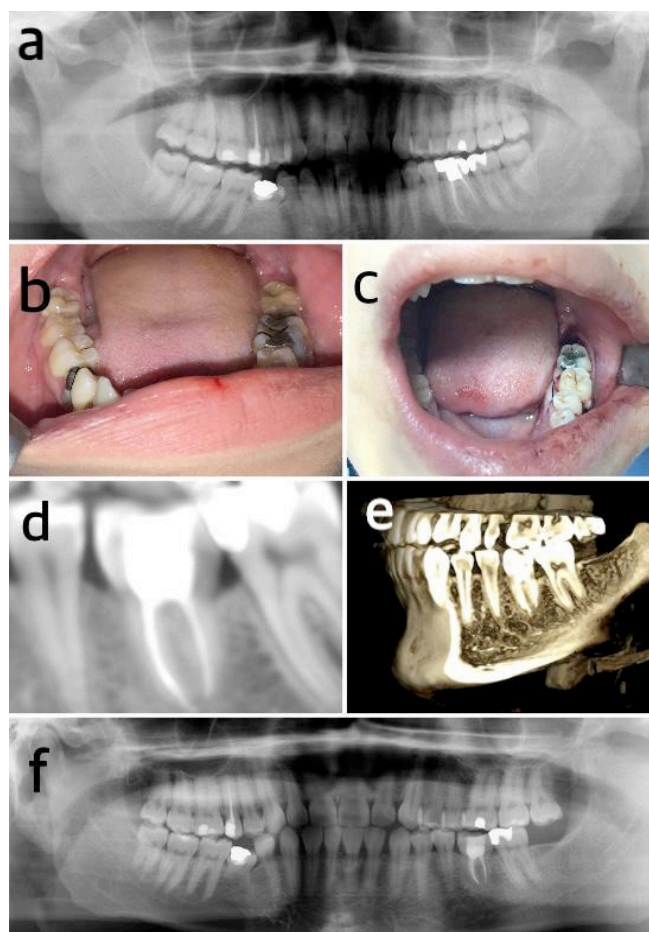


Figure 1. A: Patient’s pre-operative panoramic film, B: Patient’s pre-operative intraoral image, C: Patient’s post-operative intraoral image, D,E: Post-operative 2nd year CT images

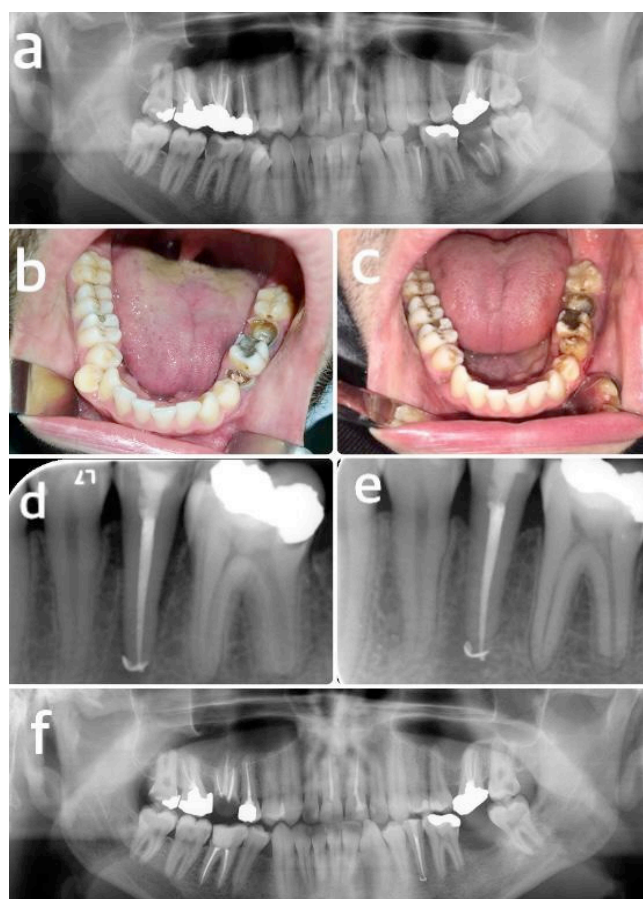


Figure 2. A: Patient’s pre-operative panoramic film, B: Patient’s pre-operative intra-oral image, C: Patient’s post-operative periapical radiographic image, D,E: Post-operative 2nd year periapical and panoramic film

no lesions. In the radiological examinations performed with cone-beam computed tomography (CBCT) in the postoperative 9th, 12th and 24th months, no signs of complications such as external root resorption and ankylosis were observed (Figure 1D, 1E, 1F).

Case 2:

A 20-year-old healthy male patient presented to the endodontics clinic of XXXX University Faculty of Dentistry for the examination of his mandibular left second premolar. In the intraoral and radiological examination, it was seen that tooth number 35 had undergone root canal treatment, and the amount of remaining tissue was insufficient to be restored (Figure 2A). Therefore, tooth extraction was decided. Tooth number 44, which was observed to be dysfunctional and outside the right lower arch, was found to be suitable for transplantation to replace the mandibular left second premolar (Figure 2B). After obtaining the informed consent from the patient, tooth number 35 was extracted atraumatically without damaging the buccal bone under local anesthesia (Ultracain D-S Forte, Aventis, Turkey). Then, the mandibular right first molar was extracted without contacting the root surface to prevent damage to the periodontal ligaments and placed carefully in the socket of the mandibular left second premolar (Figure 2C). The tooth was then positioned appropriately in the dental arch and sutured primarily. Thus, the tooth was also splinted. Afterward, the tooth was reduced from the occlusion by about 1 mm to avoid occlusal trauma.

The patient was prescribed antibiotics (amoxicillin + clavulanic acid 1000 mg twice a day), analgesics (paracetamol 500 mg twice a day), and antibacterial mouthwash (benzylamine HCl + chlorhexidine gluconate). Sutures were removed 10 days after the operation, and endodontic treatment was applied (Figure 2D).

In the postoperative 3rd month, no mobility in the tooth and no signs of infection were observed in the clinical examination. In the radiographic examination, the onset of bone apposition was seen around the roots of the transplanted tooth, and there were no lesions. In the radiological examinations performed in the postoperative 9th, 12th and 24th months, no signs of complications such as external root resorption and ankylosis were identified (Figure 2E, 2F).

Discussion

Autogenous dental transplantation can be described as the transfer of an autogenous tooth to the extraction socket of a tooth, which is congenitally missing or ectopically erupted, has crown damage, has a periodontal disease, has been traumatized, or has been extracted due to endodontic failure, or to a surgically prepared recipient site.

In the first case presented, the transplantation of the third molar tooth to the extraction socket of the mandibular left first molar with a poor prognosis (both in the same arch) is explained. In the second case, the transplantation of the mandibular right first premolar, which erupted ectopically, to the socket of the mandibular left second premolar with a poor prognosis (different arches) is explained.

The atraumatic extraction of the tooth to be transplanted in

a way that will minimally damage the periodontal ligament and cement is among the important factors that influence the success of autotransplantation. Hence, contact with the root surface should be avoided during the extraction of the tooth to be transplanted. Manual contact with the tooth to be transplanted should be minimal to protect Hertwig's epithelial sheath and pulpal tissues. Otherwise, root development may be prevented, and attachment loss, root resorption, or ankylosis may arise [5].

Inflammatory root resorption and dentoalveolar ankylosis are the most common complications after autotransplantation [6]. Considering that these complications might also develop in our cases, we used CBCT in the postoperative long-term follow-up of our cases to benefit from the advantages of CBCT mentioned in the afore-mentioned case reports in postoperative follow-ups and ensure accurate detection. In this context, no complications such as root resorption and ankylosis were observed in long-term postoperative follow-up tomography, and long-term success was achieved in the cases.

The shape and duration of fixation also influence resorption. Rigid fixation and prolonged fixation duration are reported to have an adverse effect on root length and prognosis. Handa and Handa [7] report that fixation is required for stability, there are compliance problems due to wisdom tooth morphology, the flap is tightly closed with suture fixation, new periodontal attachment is achieved, and bacterial invasion is prevented in the relevant region. Based on the results of the above-stated case reports, the transplanted teeth were fixed semi-rigidly with suture for two weeks in all our cases. In parallel with the results of other studies, we support the advantages of this approach in providing new periodontal attachment as a result of the 2-year follow-up. On the other hand, the absence of any radiolucent appearance, percussion sensitivity, or abscess formation at the root tip during this period indicated that this approach was also superior in terms of bacterial invasion.

Dioguardi et al. [8] state the parameters of evaluating the success of autotransplantation as follows: immobility of the transplanted tooth in the socket without any problem, functional and painless chewing, no mobility in the tooth, no pathological condition on radiography, normal appearance of the lamina dura on radiography, sulcus depth within normal limits, and normal gingival contour and color.

Conclusion

Autotransplantation is not an extensively used application, but it offers an alternative to implant and prosthetic treatments due to its advantages, such as being more economical and relatively simpler than different techniques, producing aesthetically and functionally satisfactory results, and maintaining the quality of the alveolar bone. However, it has also disadvantages such as the unpredictability of the treatment outcomes at times and the loss of the transplanted tooth due to probable complications.

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Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some

of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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